2. A process as claimed in claim 1, wherein the frequency of said harmonic force is substantially the same as a selected natural frequency of a structural system that idealizes said part with all movements and rotation constraints imposed on said part during said process, said selected natural frequency being the natural frequency associated with a vibration mode that has substantially the same configuration of the characterizing deformed shape of said structural system under the effect of said harmonic force.

3. A process as claimed in claim 1, including the step of pre-stressing said part by urging said second portion away from said first portion in a direction that is substantially perpendicular to said predetermined fracture plane prior to applying said harmonic force.

4. A process as claimed in claim 1, wherein said harmonic force is applied to said second portion in a direction that is substantially perpendicular to said predetermined fracture plane.

5. A process for the fracture separation, into a cap portion and a rod portion, of an integrally formed connecting rod having a bore therethrough along a predetermined fracture plane that extends through said bore, the process comprising:
   a. clamping said rod portion selectively, so as to substantially fix the rod portion;
   b. applying a harmonic force to said cap portion at a selected frequency so as to achieve a resonance condition in said connecting rod during said process to thereby create fatigue cracks; and
   c. propagating said fatigue cracks through said connecting rod until said rod portion and said cap portion are separated from each other.

6. A process as claimed in claim 5, wherein the frequency of said harmonic force is substantially the same as a selected natural frequency of a structural system that idealizes said connecting rod with all movements and rotation constraints imposed on said connecting rod during said process, said selected natural frequency being the natural frequency associated with a vibration mode that has substantially the same configuration of the characterizing deformed shape of said structural system under the effect of said harmonic force.

7. A process as claimed in claim 5, including the step of pre-stressing said connecting rod by urging said cap portion away from said rod portion in a direction that is substantially perpendicular to said predetermined fracture plane prior to applying said harmonic force.

8. A process as claimed in claim 5, wherein said harmonic force is applied to said cap portion in a direction that is substantially perpendicular to said predetermined fracture plane.

9. A process for separating a one-piece metallic item into two pieces, the process comprising: forming an aperture in the item, the aperture surrounded by an aperture surface and defining an aperture axis; selecting a fracture plane that is substantially aligned with the aperture axis, the fracture plane dividing the item into a first portion and a second portion; forming two axially extending notches that are recessed with respect to the aperture surface and substantially aligned with the fracture plane; clamping the first portion to substantially fix the first portion; applying a cyclical load to the second portion in a direction that is substantially perpendicular to the fracture plane to urge the second portion away from the first portion, thereby forming radially outwardly extending fatigue cracks in the vicinity of the notches; propagation the fatigue cracks through the item until the first and second portions are separated from each other.

10. A process as claimed in claim 9, wherein prior to applying the cyclical load, a pre-load is applied to the second portion in a direction that is perpendicular to the fracture plane.

11. A process as claimed in claim 9, wherein said cyclical load is a harmonic load that has a selected frequency so as to achieve resonance condition in said item during said process.

12. A process for separating a one-piece connecting rod into a rod and a cap, the one-piece connecting rod defining a through bore and a bore axis, the method comprising: forming two diametrically opposed and axially extending notches in the connecting rod to define a fracture plane that extends through the thorough bore and is substantially parallel to the bore axis, the fracture plane substantially defining a boundary between a portion of the connecting rod that will become the rod and a portion of the connecting rod that will become the

cap; clamping one of the portions to hold the one portion substantially fixed with respect to the other of the portions; applying a load having a load magnitude to the other of the portions in a direction that is substantially perpendicular to the fracture plane; and repeatedly changing the load magnitude to develop fatigue cracks in the vicinity of the notches and to propagate the fatigue cracks through the connecting rod until the portions are separated into the cap and the rod.

13. A process as claimed in claim 12, wherein applying the load comprises applying a mean load having a mean load value, and wherein repeatedly changing the load magnitude comprises oscillating the load magnitude about the mean load value by a load amplitude.

14. A process as claimed in claim 12, including the step of applying a dynamic force to said connecting rod during a time period centered on a time instant at which the deformed shape of said connecting rod is the closest to its original shape.

15. A process as claimed in claim 14 wherein said dynamic force is an impulsive force.

16. A process as claimed in claim 12, including the step of applying a dynamic force to said connecting rod during a time period centered on a time instant at which the stress intensity factor corresponding to said load has a maximum value.

17. A process as claimed in claim 16, wherein said dynamic force is an impulsive force.

18. A process for making a connecting rod, the process comprising: forming a one-piece connecting rod including a large end and a small end; machining a crankpin bore in the large end along a bore axis to form an axially inwardly facing bore surface; selecting a fracture plane that substantially bisects the crankpin bore and is substantially parallel to the bore axis, the fracture plane substantially defining a boundary between a cap portion and a rod portion of the one-piece connecting rod; forming two axially extending notches that are recessed with respect to the bore surface and substantially aligned with the fracture plane, the notches including notch tips; cyclically moving the cap portion and the rod portion with respect to each other along an axis that is

substantially perpendicular to the fracture plane to develop fatigue cracks at the notch tips; and propagating the fatigue cracks through the connecting rod in radially opposed directions that are substantially parallel to the fracture plane to separate the cap portion from the rod portion.

19. A process as claimed in claim 18, wherein cyclically moving the cap portion and the rod portion with respect to each other comprises applying a load having a load magnitude that substantially equal to a mean load value to the cap portion, and oscillating the load magnitude about the mean load value by a load amplitude.

20. A process as claimed in claim 18, including the step of applying a dynamic force to said connecting rod during a selected time period.

REMARKS

1. Applicant respectfully draws the examiner's attention to the fact that the priority document (Canadian Patent Application Number 2,287,140; Foreign Filing Date 10/13/1999) is identical to US Patent Application Number 09/409,599; Filed June 22, 2000 (Now US Patent Number 6,644,529) except of adding the following paragraph to the US Patent Application:

"Although the preferred mode for carrying out this invention has been set forth in this specification, it is obvious that there are several alternative modes. One of them for instance, is to apply a harmonic force to the cap, in a direction that is perpendicular to the predetermined fracture plane."
Column 6, Lines 22-27